Claims

1. A light emitting device comprising a substrate, a transparent electrode formed on said substrate, a layer of light emitting material provided over the transparent electrode and having at least one corrugated surface, and a further electrode formed over the light emitting material.

2. A light emitting device as claimed in claim 1, wherein the light emitting material is an organic material.

3. A light emitting device as claimed in claim 1 or claim 2, wherein the substrate has a corrugated surface.

4. A light emitting device as claimed in claim 1 or claim 2, wherein a conductive polymer layer is formed over the transparent electrode, the conductive polymer layer having a corrugated surface opposite to a surface facing the transparent electrode, and the light emitting material being in contact with said corrugated surface of the conductive polymer layer.

5. A light emitting device as claimed in any preceding claim, wherein the light emitting material has an absorption coefficient of less than $1000cm^{-1}$.

6. A light emitting device as claimed in any preceding claim, wherein the light emitting material comprises a conjugated polymer.

7. A light emitting device as claimed in any of claims 1 to 5, wherein the light emitting material comprises a polyflourine derivative.

8. A light emitting device as claimed in any preceding claim, wherein the corrugated surface has a pitch Λ according to the equation:-

$$\Lambda = v\lambda_0/n\sin\theta_m$$

in which angle θ_m is the angle of reflection from the upper and lower surfaces of the layer of light emitting material of light propagating in a waveguide mode m in the light emitting material, λ_o is the output wavelength, and n and v are integers.

A1 Conclude

9. A light emitting device as claimed in any preceding claim, wherein the pitch of the corrugated surface is in the range 300 to 450nm.

10. A light emitting device as claimed in any preceding claim, wherein the corrugated surface has a one-dimensional periodic structure.

11. A light emitting device as claimed in any of claim 1 to 9, wherein the corrugated surface has a two-dimensional periodic structure.

12. A light emitting device as claimed in any of claim 1 to 9, wherein the corrugated surface has a three-dimensional periodic structure.

13. A light emitting device as claimed in any of claim 1 to 9, wherein the corrugated surface has the structure of a chirping grating.

14. A light emitting device as claimed in any preceding claim, wherein the layer of light emitting material has a plurality of regions each of which has a corrugated surface with a respectively different pitch.

15. A method of manufacturing a light emitting device comprising the steps of providing a substrate, forming a transparent electrode on said substrate, providing a layer of light emitting material over the transparent electrode, arranging for the light emitting surface to have at least one corrugated surface, and forming a further electrode over the light emitting material.

16. A method of manufacturing a light emitting device as claimed in claim 15, wherein the step of arranging for the light emitting surface to have at least one corrugated surface includes providing a corrugated surface on the substrate.

17. A method of manufacturing a light emitting device as claimed in claim 16, comprising the steps of providing the substrate with a photo-setting resin, forming the corrugated surface on the substrate by shaping the resin using a mold and setting the resin by illuminating it with radiation.

18. A method of manufacturing a light emitting device as claimed in claim 15, further comprising the step of forming a conductive polymer layer over the transparent electrode and wherein the step of arranging for the light emitting surface to have at least one corrugated surface includes providing a corrugated surface on the conductive polymer layer.

19. A method of manufacturing a light emitting device as claimed in claim 18, comprising the steps of forming the corrugated surface on the conductive polymer layer by shaping the layer with a polymer mold and setting the layer by applying heat.

20. A method of manufacturing a light emitting device as claimed in claim 18, wherein the step of providing a corrugated surface on the conductive polymer layer comprises; spin coating a conductive polymer material on to the transparent electrode, spin coating a conductive polymer material on to the corrugated surface of a mold, positioning the spin coated mold on the conductive polymer layer provided on the transparent electrode so as to sandwich the two conductive polymer layers together and subsequently removing the mold.